Data from the Arctic Grayling Sport Fishery on the Kakisa River, Northwest Territories, 1971-78

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by

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ABSTRACT

Moshenko, R.W., and G. Low. 1983. Data from the Arctic grayling sport fishery on the Kakisa River, Northwest Territories, 1971-78. Can. Data Rep. Fish. Aquat. Sci. 388: iv + 27 p.

Data from the creel census and biological sampling on the Kakisa River sport fishery for the 1971-78 period are presented. Daily catch and catch/effort data for each year are included. A total of 760 Arctic grayling were sampled for age, length, weight, sex and maturity.

Key words: angling; catch/effort; sport fishing; statistics; fishery management; life history; monitoring; Thymallus arcticus.

RESUME

Moshenko, R.W., and G. Low. 1983. Data from the Arctic grayling sport fishery on the Kakisa River, Northwest Territories, 1971-78. Can. Data Rep. Fish. Aquat. Sci. 388: iv + 27 p.

Cet ouvrage renferme les résultats du recensement et de l'échantillonnage biologique effectués à l'égard des poissons pêchés à la ligne (pêche sportive) dans la Kakisa River entre 1971 et 1978. On y trouve des données sur les prises quotidiennes et sur le rapport prises/effort pour chacune des années de l'étude. Les données biologiques portent sur l'âge, la longueur, le poids, le sexe et le degré de maturité des 760 ombres arctiques, Thymallus arcticus (Pallas) prélevés.

Mots-clés: pêche à la ligne; prises/effort; pêche sportive; statistiques; gestion des pêches; cycle évolutif; contrôle, Thymallus arcticus.

INTRODUCTION

In the Northwest Territories, Arctic grayling, Thymallus arcticus (Pallas), are distributed throughout most of the freshwater drainage of the mainland but absent from the Arctic islands except Vansittart Island off Melville Peninsula (Scott and Crossman 1973). McPhail and Lindsey (1970) state that it is a uniquely attractive fish, beautiful to look at, sporting to catch, and quite palatable. It is highly prized as a gamefish and rates second in importance to lake trout in the Northwest Territories (Topolniski 1975). Most angling occurs during the spring migration run in shallow clear streams and later during the summer in deeper stream pools and bays within lakes.

A creel census and biological sampling program was initiated on the Kakisa River (Fig. 1) in 1971 to determine the angler-harvest and biological status of the game fishes, especially Arctic grayling, in order to obtain data to effectively manage this sport fishery. This report describes the sport fishery and presents the creel census and biological data (Arctic grayling only), in tabular form, gathered during the 1971-78 period. Some components of the 1971-74 data have been previously described by Falk and Dahlke (1975).

THE STUDY AREA

The Kakisa River (Fig. 1) enters Beaver Lake, a widening of the Mackenzie River, some 40 km southeast of Fort Providence, at 61°03'N latitude and 117°10'W longitude. The river system, 496 km long, originates west of the Cameron Hills and drains an area of about 14 900 km^2. It connects Tathlina and Kakisa lakes and is the mainstem for numerous tributaries which include the Cameron River, Gull Creek and Dogface Lake drainages. The flow is swift below Kakisa Lake, dropping 70 m in a distance of 20 km before it enters Beaver Lake. The streambed consists of coarse gravel and bedrock creating many rapids, riffles, gravel bars and small islands. Five km below Kakisa Lake the river drops 14.6 m over a limestone escarpment forming the Lady Evelyn Falls (Fig. 2), the first barrier to the upstream movement of fish from Beaver Lake. The mean daily water discharge during the month of May (1971-78) varied from 23-128 m^3/sec (Environment Canada 1980). The surrounding area consists of treed hills and rock outcrops interspersed with low areas of muskeg and swamps. The forest cover consists mostly of black spruce, willow and birch. The sport fishery takes place between Lady Evelyn Falls and Beaver Lake.

DESCRIPTION OF THE FISHERY

Due to the limited number of roads in the District of MacKenzie many grayling populations are accessable to anglers only by boat or aircraft. A few grayling streams with easy access from the MacKenzie Highway have become very popular angling sites in recent years. The Kakisa River, in particular, has experienced an increase in fishing pressure being the closest grayling stream to the communities of Hay River and Pine Point. It is also within a day's travel of northern Alberta and many anglers take advantage of the opportunity to fish for grayling during the early spring (Table 3).

Sport fishing on the Kakisa River begins immediately after ice break-up and continues throughout the summer. The greatest angler activity is during the spawning migration of grayling which occurs in May. At this time good angler success prevails over a period which spans at least two weekends. The grayling catch then drops off towards the end of the run and only the occasional grayling are caught for the remainder of the season. The catch of northern pike, Esox lucius Linnaeus, and walleye, Stizostedion vitreum (Mitchill), increases for a time after the grayling run and these two species are caught throughout the summer, along with the occasional longnose sucker, Catostomus castostomas (Forster), and lake whitefish, Coregonus clupeaformis (Mitchill).

Arctic grayling are not known to be present in the river system above Lady Evelyn Falls. Access to the Kakisa River is from the Mackenzie highway which bridges the river 4 km below the falls and from a road which runs parallel to the river to the settlement at Kakisa Lake (Fig. 2). Picnic and camping sites are located at Lady Evelyn Falls and at the bridge. Some anglers camp at the Old Road Fiord, several kilometers downstream from the falls. Anglers, using mostly light spinning gear with small spinners or spoons, fish from the shore or ice-edge or wade out into the stream. Boats are seldom used due to the swift and shallow nature of the stream. Most angle within a few kilometers of the bridge, which is by far the most popular fishing area during the early spring. After the May long weekend most anglers camp and fish in the Lady Evelyn Falls area.

MATERIALS AND METHODS

CREEL CENSUS STUDY

Creel census and biological sampling programs have been conducted on the Kakisa River from 1971 to 1978, except for 1973. The first two years of creel work was conducted after the spring grayling run and is therefore a measure only of early summer fishing effort rather than the peak spring period. Creel studies from 1974 to 1978 were conducted during the spring grayling run.

The majority of anglers were interviewed in their camp after they had left the stream with their catch or were encountered along the stream bank. Anglers were asked to provide the following information: place of residence, number of fish of each species caught, released, and retained, and the number of hours fished. An angler was deemed successful if any fish had been caught regardless of size, species or amount of time spent angling. Most anglers were interviewed and a record was kept of those who

were not interviewed in order to estimate total catch and effort. Creel interviews were conducted at the bridge, falls and fiord sites in order to cover all angling sites on the river.

BIOLOGICAL SAMPLING

A portion of Arctic grayling from the anglers' creel was sampled for fork length (±1 mm), round weight (±25 g), sex and maturity, and scales. Maturity was determined by examination of the gonads and coded according to the following:

Female	Male
Immature	
1-Ovaries granular in texture, up to full length in body cavity, hard and triangular in shape, firm membrane; eggs distinguishable.	6-Testes putty-like firmness, tubular and scalloped in shape, long and thin and may be full length in body cavity.
Mature	
2-Current year's spawner; ovaries fill body cavity; eggs nearing full size but not loose.	7-Current year's spawner; testes large and lobate; white-purplish in color; milt not expelled by pressure.
Ripe	
3-Ovaries greatly extended, fill body cavity; eggs full size; eggs expelled by slight pressure.	8-Testes full size; white and lobate; milt expelled by slight pressure.
Spent	
4-Spawning complete, ovaries flaccid; seed eggs apparent; presence of residual mature eggs.	9-Testes flaccid, with some milt, blood vessels obvious with pink-violet coloration.
Resting	
5-Non-virgin; not spawning in current year.	10-Non-virgin; not spawning in current year.

Fish of unknown sex were coded as 0.

Scale samples were taken from the left side of the fish above the lateral line just posterior to the leading edge of the dorsal fin and stored dry for later examination. Scales were cleaned, placed between two glass slides, and the annuli counted on an image produced by an Eberbach microprojector (x60). Scale age was recorded as being equal to the number of completed annuli.

DATA ANALYSIS

Biological data collected during the 1971-78 studies were analyzed using an IBM 370/168 computer based at the University of Manitoba and a terminal located at the Freshwater Institute. The Statistical Analysis System (1972) was used to generate length, weight, age, sex and maturity summaries and to perform basic calculations.

Weight-length relationships were determined using the following power equation:

$$\text{Log}_{10}\, W = a + b\,(\text{Log}_{10}\, L);$$

where: W = weight in grams
L = fork length in millimetres
a = Y-intercept
b = slope of the regression line,

and

S_b = standard deviation of b.

Relative condition factors (K) were determined using the formula:

$$K = \frac{W \times 10^5}{L^3}$$

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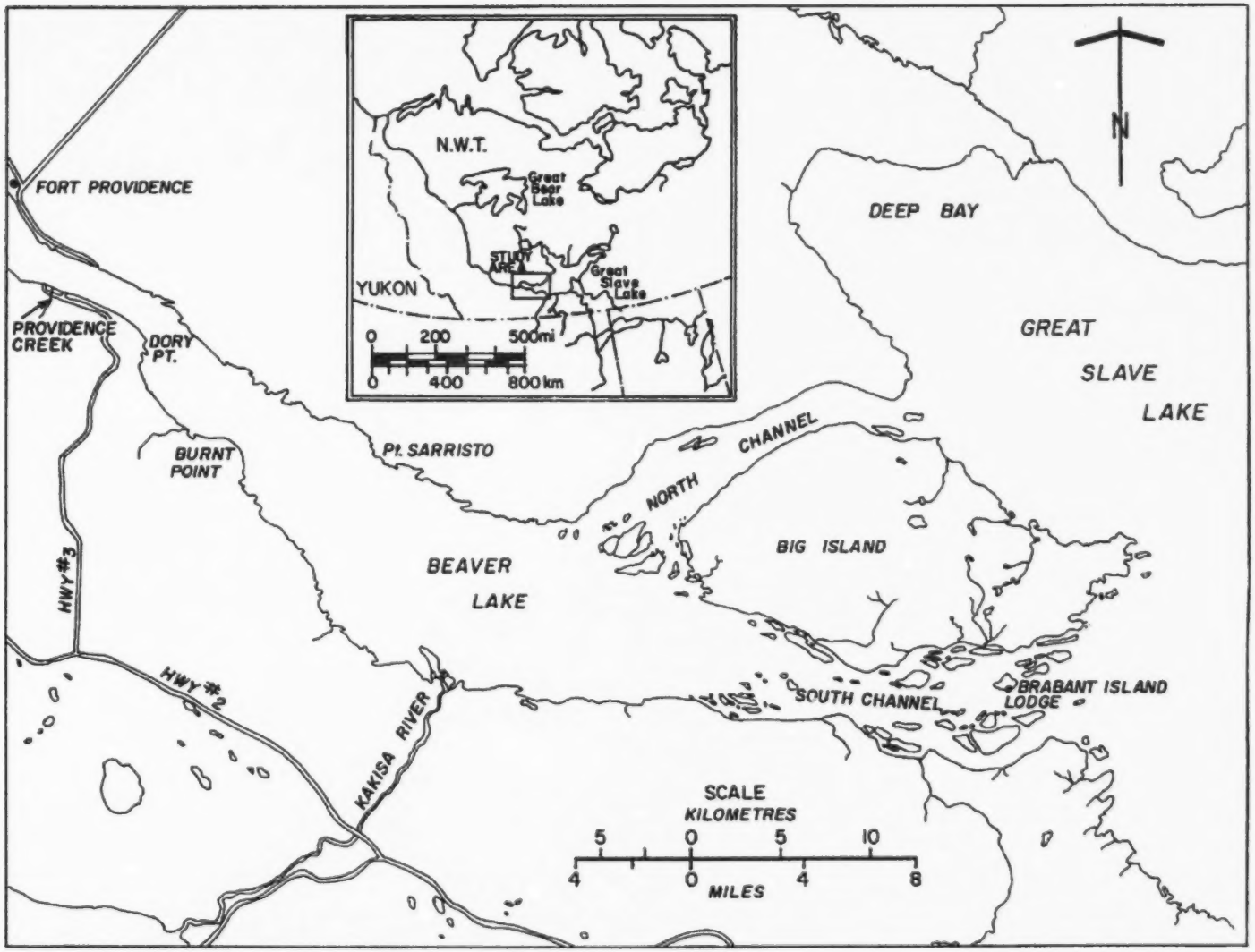

Fig. 1. Map of the upper Mackenzie River area showing the location of Kakisa River.

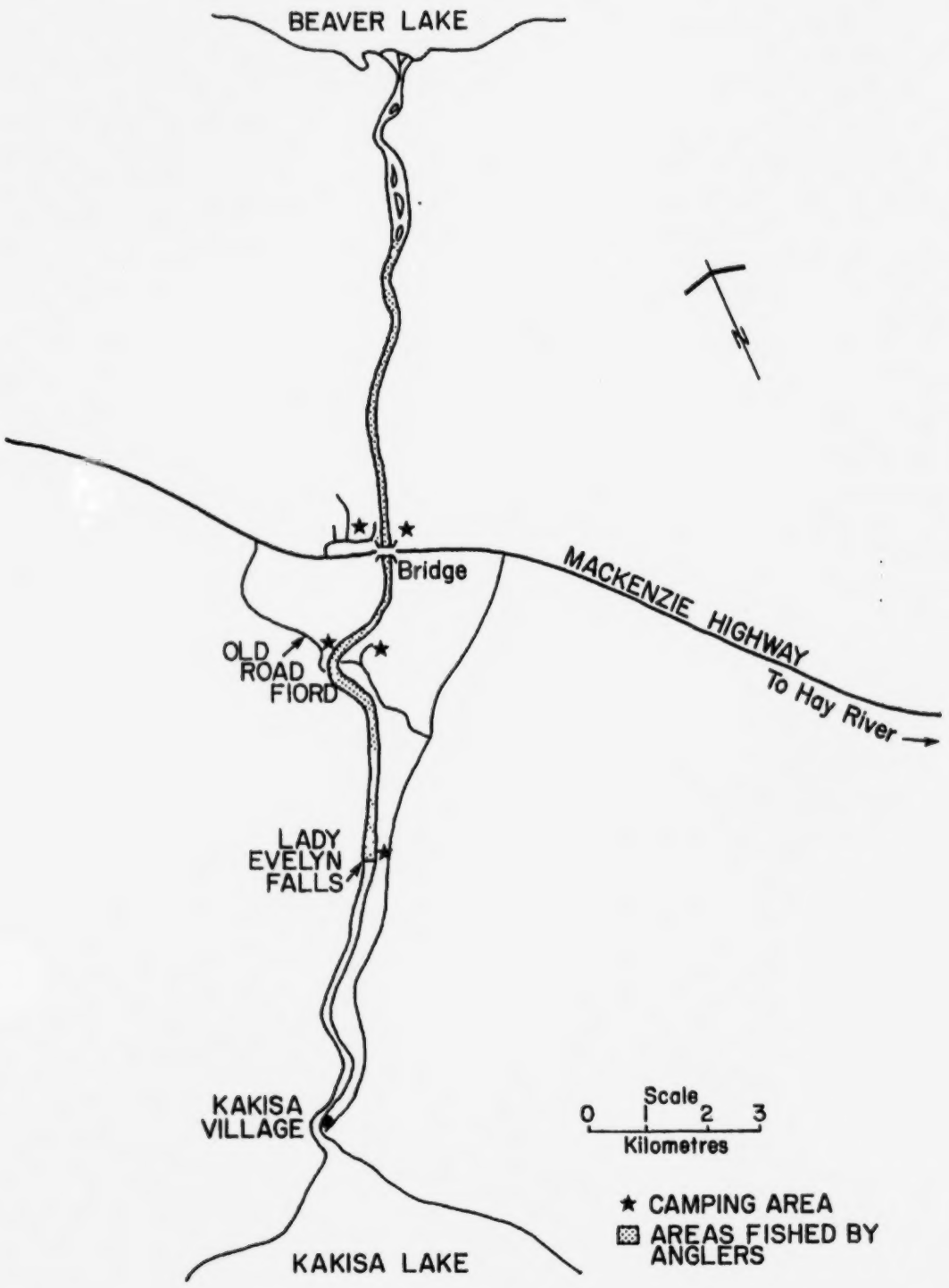

Fig. 2. Map of the Kakisa River showing the fishing areas.

Table 1. Summary of information pertaining to the fishing seasons and creel census operations from the Kakisa River sport fishery, 1971 to 1978 (1973 excluded).

Year	Fishing Season					Creel Census					Fishermen Interviews		
	From	To	No. Days	No. Days Fished	% Fished	From	To	No. Days	No. Days Censused	% of Census Worked	Conducted	No. Possible During Census Period	No. Possible During Fishing Season
1971[a]	June 4	June 14	11	-	-	June 4	June 14	11	11	100	139	-	-
1972[a]	May 26	June 20	26	-	-	May 26	June 20	26	22	85	70	-	-
1974	May 4	May 25	22	-	-	May 4	May 19	16	7	44	114	358	358
1975	May 4	May 31	28	28	100	May 4	May 31	28	8	29	150	525	525
1976	Apr 23	May 24	37	36	97	Apr 18	May 24	37	26	70	764	869	890
1977	Apr 16	May 20	35	30	86	Apr 16	May 20	35	13	37	476	533	533
1978	May 5	May 22	18	18	100	May 5	May 22	18	16	88	477	506	506

[a] During 1971 and 1972 the creel census was carried out after the grayling spawning run.

Table 2. Summary of information pertaining to the creel census and catch per unit of effort data for Arctic grayling from the Kakisa River sport fishery, 1971 to 1978 (1973 excluded).

Year	Census Period					Mean Hours Fished Per Angler-day	No. Caught		No. Kept Per Angler-day
	No. Caught	No. Released	No. Retained	% Retained	Hours Fished		Per Angler-day	Per Angler-hour	
1971[a]	73	42	31	42	183	1.3	0.5	0.4	0.2
1972[a]	39	-	-	-	173	2.5	0.6	0.2	-
1974	185	14	171	92	409	3.6	1.6	0.5	1.5
1975	178	19	159	89	458	3.1	1.2	0.4	1.1
1976	642	41	601	94	2054	2.7	0.8	0.3	0.8
1977	418	53	365	87	1079	2.3	0.9	0.4	0.8
1978	705	66	639	91	1736	3.6	1.5	0.4	1.3

[a] During 1971 and 1972 the creel census was carried out after the spawning run.

Table 3. Summary of anglers and angler-hours by place of residence for the Kakisa River sport fishery, 1975 to 1978.

	Residence	Anglers Interviewed		Angler-hours	
		Number	%	Number	%
1975:	N.W.T.	83	55.3	208.0	45.5
	Alberta	63	42.0	238.0	52.0
	Saskatchewan	2	1.3	4.5	1.0
	Ontario	1	0.7	4.0	0.8
	British Columbia	1	0.7	3.0	0.7
	Total	150	-	457.5	-
1976:	N.W.T.	428	56.0	1029.0	50.1
	Alberta	313	41.0	966.0	47.0
	Manitoba	7	0.9	19.0	0.9
	Saskatchewan	4	0.5	14.0	0.7
	British Columbia	2	0.3	8.0	0.4
	Ontario	1	0.1	5.0	0.2
	Maine	6	0.8	7.0	0.3
	Oregon	1	0.1	3.0	0.2
	Germany	2	0.3	3.0	0.2
	Total	764	-	2054.0	-
1977:	N.W.T.	313	66.0	581.0	54.0
	Alberta	158	33.0	478.0	44.0
	British Columbia	5	1.0	20.0	2.0
	Total	476	-	1079.0	-
1978:	N.W.T.	291	61.0	908.0	52.3
	Alberta	169	35.4	748.0	43.1
	Manitoba	8	1.7	34.5	2.0
	U.S.A.	9	1.9	45.0	2.6
	Total	477	-	1735.5	-

Table 4. Creel census summary from the Kakisa River sport fishery, 1971.

Date	No. Anglers Interviewed Successful	Unsuccessful	Percentage Successful	Grayling C[a]	Grayling R[b]	Grayling K[c]	Walleye C	Walleye R	Walleye K	N. Pike C	N. Pike R	N. Pike K	Ln. Sucker C	Ln. Sucker R	Ln. Sucker K	Total Hours Fished	No. Caught Per Angler	No. Caught Per Angler-hour
June 4	1	1	50.0	-	-	-	-	-	-	1	1	0	-	-	-	2.5	0.5	0.4
5	11	3	79.0	5	2	3	1	0	1	19	7	12	-	-	-	23.0	1.8	1.1
6	10	20	33.0	7	0	7	1	0	1	9	4	5	-	-	-	48.0	0.6	0.4
7	0	2	0	-	-	-	-	-	-	-	-	-	-	-	-	1.3	0	0
8	6	1	86.0	20	7	13	-	-	-	2	0	2	-	-	-	12.0	3.1	1.8
9	5	1	83.0	15	15	0	1	1	0	7	4	3	-	-	-	7.5	3.8	3.1
10	19	11	63.0	17	14	3	-	-	-	6	4	2	1	1	0	23.3	0.8	1.0
11	8	9	47.0	7	3	4	-	-	-	3	2	1	-	-	-	17.5	0.6	0.6
12	2	5	29.0	-	-	-	-	-	-	7	4	3	-	-	-	10.3	1.0	0.7
13	10	11	48.0	2	1	1	4	0	4	9	7	2	-	-	-	34.8	0.7	0.4
14	1	2	33.0	-	-	-	2	0	2	-	-	-	-	-	-	2.5	0.7	0.8
Total 11	73	66	53.0	73	42	31	9	1	8	63	33	30	1	1	0	182.5	-	-
Mean -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.2	0.9
Percent Retained					42.0			89.0			48.0			0				
No. Caught Per Angler-hour					0.40			0.05			0.35			0.01				
No. Caught Per Angler					0.53			0.07			0.45			0.01				

[a]Number caught.

[b]Number released.

[c]Number kept.

Table 5. Creel census summary from the Kakisa River sport fishery, 1972.

Date		No. Interviews	Total Hours Fished	Fish Retained						No. Retained	
				Grayling	N. Pike	Walleye	Ln. Sucker	L. Whitefish	Total	Per Angler	Per Angler-hour
May	26	3	7.0	1	7	-	-	-	8	2.7	1.1
	27	3	6.0	2	3	1	-	-	6	2.0	1.0
	28	1	2.0	-	3	-	1	-	4	4.0	2.0
	29	2	4.0	-	3	-	-	-	3	1.5	0.7
	30	2	7.0	-	4	-	-	-	4	2.0	0.6
	31	3	7.0	2	4	-	-	-	6	2.0	0.9
June	1	3	11.0	3	2	-	-	-	5	1.7	0.5
	2	4	9.0	-	10	-	-	-	10	2.5	1.1
	3	13	41.0	14	15	3	2	-	24	1.9	0.6
	4	1	2.0	-	2	-	-	-	2	2.0	1.0
	5	3	4.0	-	1	2	-	-	3	1.0	0.8
	7	3	7.0	-	-	3	-	-	3	1.0	0.4
	8	5	8.0	4	1	3	-	-	8	1.6	1.0
	9	2	4.0	-	1	2	-	-	3	1.5	0.8
	11	3	9.5	1	2	-	-	-	3	1.0	0.3
	14	1	1.0	1	-	1	-	-	2	2.0	2.0
	15	3	9.0	1	4	-	-	-	5	1.7	0.6
	16	5	15.0	2	4	2	-	-	8	1.6	0.5
	17	3	18.0	7	2	-	-	2	11	3.7	0.6
	18	3	-	1	4	-	-	-	5	1.7	-
	19	3	-	-	3	-	-	-	3	1.0	-
	20	1	1.0	-	3	-	-	-	3	3.0	3.0
Total	22	70	172.5	39	78	17	3	2	139	-	-
Mean	-	-	-	-	-	-	-	-	-	2.0	0.8
No. Retained Per Angler-hour				0.23	0.45	0.10	0.02	0.02			
No. Retained Per Angler				0.56	1.11	0.24	0.04	0.03			

Table 6. Creel census summary from Kakisa River sport fishery, 1974.

Date	No. Anglers Interviewed		Percentage	Grayling			Walleye			N. Pike			R. Whitefish			Ln. Sucker			Total	No. Caught	
	Successful	Unsuccessful	Successful	C[a]	R[b]	K[c]	C	R	K	C	R	K	C	R	K	C	R	K	Hours Fished	Per Angler	Per Angler-hour
May 4	6	0	100.0	44	5	39	-	-	-	-	-	-	-	-	-	-	-	-	44.0	7.3	1.0
5	5	2	71.0	34	0	34	-	-	-	2	0	2	1	0	1	-	-	-	46.0	5.3	0.8
11	21	1	95.0	48	3	45	-	-	-	9	0	9	-	-	-	1	0	1	101.0	2.6	0.6
12	17	3	85.0	28	6	22	-	-	-	3	1	2	-	-	-	-	-	-	61.0	1.6	0.5
17	4	0	100.0	10	0	10	-	-	-	8	5	3	-	-	-	-	-	-	18.0	4.5	1.0
18	23	11	68.0	20	0	20	2	0	2	16	2	14	-	-	-	2	0	2	77.0	1.2	0.5
19	9	12	43.0	11	0	11	-	-	-	5	0	5	-	-	-	-	-	-	61.5	0.8	0.3
Total 7	85	29	75.0	185	14	181	2	0	2	43	8	35	1	0	1	3	0	3	408.5	-	-
Mean -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.1	0.7
Percent Retained				98.0			100			81.0			100			100					
No. Caught Per Angler-hour				0.50			0.01			0.1			<0.01			0.01					
No. Caught Per Angler				1.62			0.02			0.04			0.01			0.03					

[a]Number caught.

[b]Number released.

[c]Number kept.

Table 7. Creel census summary from Kakisa River sport fishery, 1975.

Date		No. Anglers Interviewed Successful	Unsuccessful	Percentage Successful	Grayling C[a]	Grayling R[b]	Grayling K[c]	N. Pike C	N. Pike R	N. Pike K	Walleye C	Walleye R	Walleye K	Total Hours Fished	No. Caught Per Angler	No. Caught Per Angler-hour
May	4	16	28	36.0	43	4	39	1	0	1	-	-	-	106.5	1.0	0.4
	5	7	2	78.0	40	3	37	-	-	-	-	-	-	44.0	4.5	0.9
	8	5	2	71.0	5	2	3	3	0	3	-	-	-	19.5	1.1	0.4
	10	22	10	73.0	58	9	49	34	15	19	-	-	-	149.5	2.9	0.6
	11	14	24	37.0	11	0	11	14	5	9	-	-	-	88.0	0.7	0.3
	18	12	3	80.0	20	1	19	49	32	17	-	-	-	42.5	4.7	1.7
	30	1	0	100.0	-	-	-	2	0	2	-	-	-	2.5	2.0	0.8
	31	4	0	100.0	1	0	1	6	0	6	2	0	2	5.0	2.3	1.8
Total	8	81	69	54.0	178	19	159	109	52	57	2	0	2	457.5	-	-
Mean	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.9	0.6

	Grayling	N. Pike	Walleye
Percent Retained	89.3	52.3	100
No. Caught Per Angler-hour	0.39	0.24	<0.01
No. Caught Per Angler	1.19	0.73	0.01

[a]Number caught.

[b]Number released.

[c]Number kept.

Table 8. Creel census summary from Kakisa River sport fishery, 1976.

Date	No. Anglers Interviewed			Percentage Successful	Grayling			N. Pike			Walleye			Ln. Sucker			Total Hours Fished	No. Caught	
	Successful	Unsuccessful			C[a]	R[b]	K[c]	C	R	K	C	R	K	C	R	K		Per Angler	Per Angler-hour
April 18	0	4		0	-	-	-	-	-	-	-	-	-	-	-	-	4.0	-	-
19	1	3		25.0	3	0	3	-	-	-	-	-	-	-	-	-	10.0	0.8	0.4
23	1	9		11.0	1	0	1	-	-	-	-	-	-	-	-	-	28.5	0.1	0.0
24	7	34		17.0	8	0	8	-	-	-	-	-	-	-	-	-	136.0	0.2	0.1
25	0	8		0	-	-	-	-	-	-	-	-	-	-	-	-	12.0	-	-
28	0	13		0	-	-	-	-	-	-	-	-	-	-	-	-	17.0	-	-
29	7	7		50.0	22	0	22	-	-	-	-	-	-	-	-	-	63.0	1.6	0.3
30	13	16		45.0	41	4	37	1	1	0	-	-	-	-	-	-	88.0	1.5	0.5
May 1	38	39		49.0	64	0	64	1	0	1	-	-	-	-	-	-	252.0	0.8	0.3
2	53	51		51.0	102	0	102	-	-	-	--	-	-	-	-	-	341.0	1.0	0.3
3	18	5		78.0	62	16	46	-	-	-	-	-	-	-	-	-	91.0	2.7	0.7
4	8	13		38.0	24	5	19	-	-	-	-	-	-	-	-	-	69.0	1.1	0.3
5	7	6		54.0	24	0	24	-	-	-	-	-	-	-	-	-	33.0	1.8	0.7
6	13	7		65.0	31	3	28	-	-	-	-	-	-	-	-	-	64.0	1.5	0.5
7	20	12		63.0	84	10	74	9	1	8	1	0	1	-	-	-	82.0	2.9	1.1
8	33	59		36.0	88	0	88	8	0	8	-	-	-	-	-	-	239.0	1.0	0.4
9	25	39		39.0	42	3	39	6	0	6	-	-	-	1	1	0	130.0	0.8	0.4
10	2	5		29.0	10	0	10	-	-	-	-	-	-	-	-	-	13.5	1.4	0.7
14	5	6		45.0	4	0	4	4	0	4	-	-	-	1	1	0	23.0	0.8	0.4
15	8	13		38.0	2	0	2	12	0	12	-	-	-	-	-	-	50.0	0.7	0.3
16	2	10		17.0	1	0	1	6	5	1	-	-	-	-	-	-	18.0	0.6	0.4
17	2	5		29.0	-	-	-	3	0	3	-	-	-	-	-	-	11.0	0.4	0.3
21	2	1		67.0	1	0	1	3	0	3	-	-	-	-	-	-	5.0	1.3	0.8
22	36	16		69.0	4	0	4	27	0	27	2	0	2	-	-	-	105.0	0.6	0.3
23	33	30		52.0	19	0	19	52	6	46	23	0	23	-	-	-	140.0	1.5	0.7
24	12	7		63.0	5	0	5	9	0	9	3	0	3	-	-	-	29.0	0.9	0.6
Total 26	346	418		45.0	642	41	601	141	13	128	29	0	29	2	2	0	2054.0	-	-
Mean -	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.1	0.4
Percent Retained					93.6			90.8			100			0					
No. Caught Per Angler-hour					0.31			0.07			0.01			<0.01					
No. Caught Per Angler					0.84			0.18			0.04			<0.01					

[a]Number caught.

[b]Number released.

[c]Number kept.

Table 9. Creel census summary from Kakisa River sport fishery, 1977.

Date	No. Anglers Interviewed Successful	Unsuccessful	Percentage Successful	Grayling C[a]	Grayling R[b]	Grayling K[c]	N. Pike C	N. Pike R	N. Pike K	Walleye C	Walleye R	Walleye K	Ln. Sucker C	Ln. Sucker R	Ln. Sucker K	R. Whitefish C	R. Whitefish R	R. Whitefish K	Total Hours Fished	No. Caught Per Angler	No. Caught Per Angler-hour
April 16	0	6	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.0	0	0
23	7	33	18.0	9	2	7	-	-	-	-	-	-	-	-	-	-	-	-	143.0	0.2	0.1
24	3	36	10.0	7	0	7	-	-	-	-	-	-	-	-	-	-	-	-	100.0	0.2	0.1
29	12	6	67.0	38	4	34	2	2	0	-	-	-	-	-	-	2	0	2	49.5	2.2	0.8
30	35	20	64.0	103	23	80	2	0	2	-	-	-	-	-	-	-	-	-	102.0	1.9	1.0
May 1	22	19	54.0	61	9	52	4	2	2	-	-	-	-	-	-	1	0	1	171.3	1.6	0.4
2	3	4	43.0	10	0	10	-	-	-	-	-	-	-	-	-	-	-	-	14.0	1.4	0.7
5	6	2	75.0	18	7	11	1	1	0	-	-	-	-	-	-	-	-	-	17.0	2.4	1.1
6	17	8	68.0	62	4	58	9	2	7	-	-	-	-	-	-	-	-	-	63.5	2.8	1.1
7	66	96	43.0	40	1	39	35	5	30	-	-	-	22	16	6	-	-	-	230.0	0.6	0.4
8	25	31	45.0	59	3	56	16	6	10	1	0	1	8	8	0	-	-	-	129.0	1.5	0.6
14	4	4	50.0	7	0	7	4	0	4	-	-	-	-	-	-	-	-	-	20.0	1.4	0.6
15	2	9	18.0	4	0	4	7	0	7	-	-	-	2	2	0	-	-	-	34.5	1.2	0.4
Total 13	202	274	42.0	418	53	365	80	18	62	1	0	1	32	26	6	3	0	3	1078.75	-	-
Mean -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.3	0.4

Percentage Retained		87.0		78.0		100		19.0		100	
No. Caught Per Angler-hour		0.39		0.07		<0.01		0.03		0.01	
No. Caught Per Angler		0.88		0.17		<0.01		0.07		0.01	

[a]Number caught.

[b]Number released.

[c]Number kept.

Table 10. Creel census summary from Kakisa River sport fishery, 1978.

Date	No. Anglers Interviewed Successful	Unsuccessful	Percentage Successful	Grayling C[a]	Grayling R[b]	Grayling K[c]	N. Pike C	N. Pike R	N. Pike K	Walleye C	Walleye R	Walleye K	R. Whitefish C	R. Whitefish R	R. Whitefish K	Ln. Sucker C	Ln. Sucker R	Ln. Sucker K	Total Hours Fished	No. Caught Per Angler	No. Caught Per Angler-hour
May 5	9	0	100.0	50	6	44	-	-	-	-	-	-	2	0	2	-	-	-	31.5	5.8	1.7
6	30	20	60.0	73	1	72	1	0	1	-	-	-	2	0	2	1	1	0	224.0	1.5	0.3
7	19	11	63.3	54	6	48	-	-	-	1	0	1	1	0	1	-	-	-	124.5	1.9	0.5
10	13	6	68.4	28	0	28	1	0	1	-	-	-	-	-	-	-	-	-	68.0	1.5	0.4
11	9	6	60.0	38	0	38	-	-	-	-	-	-	-	-	-	-	-	-	40.0	2.5	1.0
12	21	11	65.6	71	5	66	5	4	1	-	-	-	-	-	-	-	-	-	120.0	2.4	0.6
13	47	44	51.6	131	7	124	9	2	7	-	-	-	-	-	-	15	15	0	419.5	1.7	0.4
14	14	18	43.7	21	1	20	-	-	-	-	-	-	-	-	-	3	3	0	103.0	0.8	0.2
15	3	1	75.0	5	0	5	-	-	-	-	-	-	-	-	-	-	-	-	17.5	1.3	0.3
16	2	7	22.2	3	0	3	-	-	-	-	-	-	-	-	-	-	-	-	39.0	0.3	0.1
17	2	5	28.6	1	0	1	4	0	4	-	-	-	-	-	-	-	-	-	21.0	0.7	0.2
18	3	4	42.9	3	0	3	1	0	1	-	-	-	1	0	1	-	-	-	11.0	0.7	0.5
19	20	3	87.0	55	10	45	10	2	8	-	-	-	-	-	-	7	7	0	66.0	3.1	1.1
20	45	29	60.8	88	23	65	65	29	36	3	0	3	-	-	-	5	5	0	236.5	2.2	0.7
21	39	24	61.9	79	7	72	42	17	25	-	-	-	-	-	-	8	8	0	194.0	2.1	0.7
22	3	9	25.0	5	0	5	5	0	5	-	-	-	-	-	-	-	-	-	20.0	0.8	0.5
Total 16	279	198	55.5	705	66	639	143	54	89	4	0	4	6	0	6	39	39	0	1735.5	-	-
Mean	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.9	0.5
Percent Retained					90.6			62.2			100.0			100.0			0				
No. Caught Per Angler-hour					0.41			0.08			< 0.01			< 0.01			0.02				
No. Caught Per Angler					1.48			0.30			< 0.01			< 0.01			0.08				

[a] Number caught.

[b] Number released.

[c] Number kept.

Table 11. Mean fork length, mean weight, condition factor, maturity and sex ratio by length interval for Arctic grayling from the Kakisa River, 1972.

Length Interval (mm)	No.	Fork Length (mm) Mean	SD	Weight (g) Mean	SD	Condition Factor	Males No.	Males % Mature	Females No.	Females % Mature	F/M Ratio	No. Unknown Sex
220 - 229	1	221	-	100	-	0.93	-	-	-	-	-	1
230 - 239	-	-	-	-	-	-	-	-	-	-	-	-
240 - 249	1	240	-	150	-	1.09	-	-	-	-	-	1
290 - 299	1	290	-	300	-	1.23	1	0	-	-	-	-
300 - 309	1	300	-	300	-	1.11	-	-	1	0	-	-
310 - 319	1	310	-	340	-	1.14	1	0	-	-	-	-
320 - 329	-	-	-	-	-	-	-	-	-	-	-	-
330 - 339	2	335	-	500	-	1.33	1	100	1	0	1.0	-
340 - 349	1	345	-	425	-	1.03	1	100	-	-	-	-
350 - 359	-	-	-	-	-	-	-	-	-	-	-	-
360 - 369	5	361	2.2	510	76.2	1.08	2	50	2	100	1.0	1
370 - 379	3	373	3.2	558	62.9	1.07	-	-	2	100	-	1
380 - 389	1	385	-	700	-	1.23	-	-	1	100	-	-
390 - 399	3	394	3.6	678	20.2	1.11	2	100	1	100	0.5	-
400 - 409	3	402	4.0	667	52.0	1.02	1	100	2	50	2.0	-
410 - 419	4	412	4.0	746	43.5	1.07	2	0	1	100	0.5	1
420 - 429	5	422	2.7	850	58.6	1.13	1	100	3	100	3.0	1
430 - 439	3	432	2.9	820	41.7	1.02	1	0	2	100	2.0	-
440 - 449	1	445	-	850	-	0.96	-	0	1	100	-	-
450 - 459	1	455	-	1000	-	1.06	-	-	-	-	-	-
490 - 499	1	490	-	1200	-	1.02	1	100	-	0	-	-
Total	38	-	-	-	-	-	14	57	17	82	1.2	7
Mean	-	382	56.1	640	230.4	1.09	-	-	-	-	-	-

Table 12. Mean fork length, mean weight, condition factor, maturity and sex ratio by length interval for Arctic grayling from the Kakisa River, 1974.

Length Interval (mm)	No.	Fork Length (mm) Mean	SD	Weight (g) Mean	SD	Condition Factor	Males No.	Males % Mature	Females No.	Females % Mature	F/M Ratio	No. Unknown Sex
280 - 289	1	280	-	240	-	1.09	-	-	-	-	-	1
290 - 299	-	-	-	-	-	-	-	-	-	-	-	-
300 - 309	-	-	-	-	-	-	-	-	-	-	-	-
310 - 319	3	312	1.5	351	1.4	1.14	1	0	1	0	1.0	1
320 - 329	2	324	6.4	420	-	1.18	2	0	-	-	-	2
330 - 339	3	333	4.2	525	35.3	1.45	2	0	-	-	-	1
350 - 359	4	356	1.7	600	-	1.34	-	-	2	0	-	2
360 - 369	9	364	2.2	573	37.1	1.18	4	25	3	0	0.8	2
370 - 379	6	373	3.4	580	57.1	1.12	3	0	-	-	-	3
380 - 389	7	382	3.0	643	101.0	1.15	1	0	3	66	3.0	3
390 - 391	8	394	3.0	735	59.3	1.20	3	66	2	50	0.7	3
400 - 409	11	404	3.7	804	62.1	1.22	5	60	3	66	0.6	3
410 - 419	12	414	3.3	815	48.9	1.15	5	40	3	100	0.6	4
420 - 429	12	423	3.7	955	93.4	1.26	4	75	5	80	1.3	3
430 - 439	8	433	3.4	988	66.8	1.21	1	0	3	100	3.0	4
440 - 449	7	442	1.8	986	62.7	1.14	3	0	3	100	1.0	1
450 - 459	14	455	3.0	1081	112.4	1.15	5	60	6	83	1.2	3
460 - 469	3	461	1.7	1092	94.6	1.11	1	0	1	100	1.0	1
470 - 479	2	472	2.1	1400	-	1.35	1	100	-	-	-	1
480 - 489	1	485	-	-	-	1.35	-	-	-	-	-	1
Total	113[a]	-	-	-	-	-	39	36	35	69	0.9	39
Mean	-	406	40.7	831	226.0	1.19	-	-	-	-	-	-

[a] Sample included 39 dressed fish used only for length calculations.

Table 13. Mean fork length, mean weight, condition factor, maturity and sex ratio by length interval for Arctic grayling from the Kakisa River, 1975.

Length Interval (mm)	No.	Fork Length (mm)		Weight (g)		Condition Factor	Males		Females		F/M Ratio	No. Unknown Sex
		Mean	SD	Mean	SD		No.	% Mature	No.	% Mature		
360 - 369	1	365	-	500	-	1.03	-	-	1	0	-	-
370 - 379	4	374	3.1	729	121.5	1.39	3	100	1	100	0.3	-
380 - 389	1	388	-	850	-	1.46	1	100	-	-	-	-
390 - 399	2	397	-	765	-	1.22	2	100	-	-	-	-
400 - 409	3	402	2.0	960	17.3	1.48	3	66	-	-	-	-
410 - 419	4	415	3.1	1055	84.7	1.47	3	100	1	100	0.3	-
420 - 429	4	426	1.3	1137	94.6	1.47	2	50	2	100	1.0	-
430 - 439	4	435	1.9	1150	108.0	1.39	1	100	3	66	3.0	-
440 - 449	5	446	2.4	1120	57.0	1.27	3	100	2	50	0.6	-
450 - 459	3	456	3.2	1263	109.7	1.34	1	100	1	100	1.0	1
460 - 469	2	464	2.8	1300	-	1.30	2	100	-	-	-	-
470 - 479	1	471	-	1400	-	1.34	1	100	-	-	-	-
480 - 489	1	487	-	1360	-	1.18	1	100	-	-	-	-
Total	35	-	-	-	-	-	23	91	11	73	0.5	1
Mean	-	424	31.2	1051	222.5	1.36	-	-	-	-	-	-

Table 14. Mean fork length, mean weight, condition factor, maturity and sex ratio by length interval for Arctic grayling from the Kakisa River, 1976.

Length Interval (mm)	No.	Fork Length (mm) Mean	SD	Weight (g) Mean	SD	Condition Factor	Males No.	Males % Mature	Females No.	Females % Mature	F/M Ratio	No. Unknown Sex
300 - 309	1	308	-	375	-	1.28	1	0	-	-	-	-
310 - 319	-	-	-	-	-	-	-	-	-	-	-	-
320 - 329	-	-	-	-	-	-	-	-	-	-	-	-
330 - 339	1	332	-	525	-	1.43	-	-	1	100	-	-
340 - 349	1	349	-	500	-	1.18	1	100	-	-	-	-
350 - 359	5	352	2.7	545	48.0	1.24	1	100	4	100	4.0	-
360 - 369	4	366	1.3	619	59.1	1.26	1	100	3	100	3.0	-
370 - 379	8	374	3.0	622	60.4	1.19	1	100	6	100	6.0	1
380 - 389	17	385	2.5	716	59.2	1.26	1	100	15	93	15.0	1
390 - 399	17	395	2.6	766	85.2	1.24	4	100	11	100	2.7	2
400 - 409	21	405	2.8	801	54.5	1.21	2	100	17	100	8.5	2
410 - 419	11	415	3.0	868	51.3	1.21	2	100	7	100	3.5	2
420 - 429	22	425	2.8	905	88.3	1.18	2	100	17	100	8.5	3
430 - 439	14	435	2.8	970	97.3	1.18	3	100	7	100	2.4	4
440 - 449	14	444	3.0	995	60.6	1.14	5	100	8	100	1.6	1
450 - 459	17	454	3.4	1039	92.3	1.11	5	100	10	100	2.0	2
460 - 469	9	462	1.9	1100	95.2	1.12	4	100	4	100	1.0	1
470 - 479	-	-	-	-	-	-	-	-	-	-	-	-
480 - 489	2	482	0.7	1325	35.3	1.18	-	-	-	-	-	2
Total	164	-	-	-	-	-	33	97	110	99	3.3	21
Mean	-	415	31.7	858	176.0	1.19	-	-	-	-	-	-

Table 15. Mean fork length, mean weight, condition factor, maturity and sex ratio by length interval for Arctic grayling from the Kakisa River, 1977.

Length Interval (mm)	No.	Fork Length (mm)		Weight (g)		Condition Factor	Males		Females		F/M Ratio	No. Unknown Sex
		Mean	SD	Mean	SD		No.	% Mature	No.	% Mature		
270 - 279	1	272	-	-	-	-	-	-	-	-	-	1
280 - 289	-	-	-	-	-	-	-	-	-	-	-	-
290 - 299	1	292	-	400	-	1.61	1	0	-	-	-	-
300 - 309	-	-	-	-	-	-	-	-	-	-	-	-
310 - 319	1	314	-	450	-	1.45	1	0	-	-	-	-
320 - 329	1	323	-	-	-	-	-	-	1	100	-	-
330 - 339	5	336	2.2	500	-	1.31	-	-	2	50	-	3
340 - 349	5	345	3.4	525	43.3	1.28	2	0	1	0	0.5	2
350 - 359	5	354	3.3	650	70.7	1.48	1	0	2	100	2.0	2
360 - 369	15	365	3.1	677	62.9	1.39	5	60	5	80	1.0	5
370 - 379	20	372	2.5	723	60.7	1.39	2	50	10	80	5.0	8
380 - 389	15	383	3.4	735	67.9	1.30	3	100	7	100	2.3	5
390 - 399	23	394	3.0	786	76.3	1.29	10	90	9	89	0.9	4
400 - 409	24	405	3.0	847	73.2	1.27	10	90	9	100	0.9	5
410 - 419	30	414	2.9	917	68.0	1.28	9	100	10	100	1.1	11
420 - 429	21	425	2.8	980	102.5	1.28	8	100	8	100	1.0	5
430 - 439	20	435	2.8	1032	72.7	1.26	13	100	5	100	0.4	2
440 - 449	11	443	2.6	1058	91.8	1.21	6	100	3	100	0.5	2
450 - 459	14	454	3.0	1153	110.0	1.23	7	100	2	100	0.3	5
460 - 469	10	463	3.1	1190	103.4	1.20	5	100	3	100	0.6	2
470 - 479	1	471	-	1125	-	1.08	1	100	-	-	-	-
Total	224[a]	-	-	-	-	-	84	88	77	90	0.9	63
Mean	-	404	35.1	886	189.0	1.29	-	-	-	-	-	-

[a] Sample included 63 dressed fish used only for length calculations.

Table 16. Mean fork length, mean weight, condition factor, maturity and sex ratio by length interval for Arctic grayling from the Kakisa River, 1978.

Length Interval (mm)	No.	Fork Length (mm) Mean	SD	Weight (g) Mean	SD	Condition Factor	Males No.	Males % Mature	Females No.	Females % Mature	F/M Ratio
300 - 309	1	308	-	375	-	1.28	-	-	1	0	-
310 - 319	1	310	-	400	-	1.34	1	0	-	-	-
320 - 329	-	-	-	-	-	-	-	-	-	-	-
330 - 339	1	337	-	475	-	1.24	-	-	1	0	-
340 - 349	2	345	4.2	563	53.0	1.37	1	100	1	0	1.0
350 - 359	2	355	0.7	600	-	1.35	1	100	1	0	1.0
360 - 369	10	365	1.5	652	67.0	1.34	3	100	7	100	2.3
370 - 379	10	375	1.8	718	64.6	1.36	4	100	6	100	1.5
380 - 389	26	384	2.9	732	61.8	1.29	13	100	13	100	1.0
390 - 399	14	393	3.3	728	62.8	1.20	12	100	2	100	0.2
400 - 409	27	405	3.0	858	84.3	1.29	13	100	14	100	1.1
410 - 419	16	415	2.2	884	70.0	1.24	11	91	5	100	0.5
420 - 429	19	424	2.2	954	85.5	1.25	16	100	3	100	0.2
430 - 439	22	434	2.5	1001	75.4	1.23	13	100	9	100	0.7
440 - 449	13	444	2.1	1009	82.0	1.15	8	88	5	100	0.6
450 - 459	15	453	2.7	1108	91.9	1.19	11	100	4	100	0.4
460 - 469	4	465	2.4	1094	155.9	1.09	4	100	-	-	-
470 - 479	1	476	-	1075	-	1.00	-	-	1	100	-
480 - 489	2	483	0.7	1225	106.1	1.09	2	100	-	-	-
Total	186	-	-	-	-	-	113	97	73	95	0.8
Mean	-	410	31.4	869	173.8	1.25	-	-	-	-	-

Table 17. Mean fork length, mean weight, condition factor, maturity and sex ratio by length interval for Arctic grayling from the Kakisa River, 1972-78 (1973 excluded).

Length Interval (mm)	No.	Fork Length (mm)		Weight (g)		Condition Factor	Males		Females		F/M Ratio	No. Unknown Sex
		Mean	SD	Mean	SD		No.	% Mature	No.	% Mature		
220 - 229	1	221	-	100	-	0.93	-	-	-	-	-	1
230 - 239	-	-	-	-	-	-	-	-	-	-	-	-
240 - 249	1	240	-	150	-	1.09	-	-	-	-	--	1
250 - 259	-	-	-	-	-	-	-	-	-	-	--	-
260 - 269	-	-	-	-	-	-	-	-	-	-	-	-
270 - 279	1	272	-	-	-	-	-	-	-	-	-	1
280 - 289	1	280	-	240	-	1.09	-	-	-	-	-	1
290 - 299	2	291	1.4	350	70.7	1.42	2	0	-	-	-	-
300 - 309	3	305	4.6	350	43.3	1.23	1	0	2	0	2.0	-
310 - 319	6	312	1.8	378	46.3	1.25	4	0	1	0	3.0	1
320 - 329	3	324	4.5	420	-	1.18	-	-	1	0	-	2
330 - 339	12	335	2.6	506	22.2	1.36	3	33	5	40	1.7	4
340 - 349	9	345	3.2	518	57.2	1.26	5	60	2	0	0.4	2
350 - 359	16	354	2.8	584	56.2	1.32	3	67	9	67	3.0	4
360 - 369	44	365	2.7	616	82.9	1.27	15	60	21	76	1.4	8
370 - 379	51	373	2.7	676	89.8	1.29	13	69	25	92	1.9	13
380 - 389	67	384	3.0	723	68.2	1.27	19	95	39	95	2.1	9
390 - 399	67	394	3.0	755	75.1	1.23	33	91	25	92	0.8	9
400 - 409	89	404	3.1	832	83.2	1.26	34	88	45	96	1.3	10
410 - 419	77	414	2.9	882	89.0	1.24	32	81	27	100	0.8	18
420 - 429	84	424	2.9	948	104.0	1.24	33	94	39	95	1.2	12
430 - 439	71	434	2.8	1003	96.7	1.22	32	94	29	97	0.9	10
440 - 449	51	444	2.6	1019	84.5	1.17	25	84	22	95	0.9	4
450 - 459	64	454	3.0	1094	111.6	1.17	29	93	23	96	0.8	12
460 - 469	28	463	2.7	1141	116.6	1.15	16	94	8	100	0.5	4
470 - 479	5	472	2.4	1250	174.4	1.19	3	100	1	100	0.3	1
480 - 489	6	484	2.0	1292	84.1	1.14	3	100	-	-	-	3
490 - 499	1	490	-	1200	-	1.02	1	100	-	-	-	-
Total	760[a]	-	-	-	-	-	306	85	324	91	1.1	131
Mean	-	408	36.3	862	203.4	1.23	-	-	-	-	-	-

[a] Sample includes 102 dressed fish used only for length calculations.

Table 18. Mean fork length, mean weight, and condition factor by length interval for male Arctic grayling from the Kakisa River, 1972-78 (excluding 1973).

Length Interval (mm)	No.	Fork Length (mm) Mean	SD	Weight (g) Mean	SD	Condition Factor
290 - 299	2	291	1.4	350	70.7	1.42
300 - 309	1	308	-	375	-	1.28
310 - 319	4	312	1.9	386	50.2	1.27
320 - 329	-	-	-	-	-	-
330 - 339	3	332	2.5	517	28.9	1.41
340 - 349	5	346	2.9	505	54.2	1.21
350 - 359	3	352	2.1	575	43.3	1.32
360 - 369	15	364	2.7	612	93.8	1.26
370 - 379	13	374	3.2	698	88.9	1.34
380 - 389	19	384	2.6	707	72.1	1.25
390 - 399	33	394	2.9	746	63.8	1.21
400 - 409	34	404	3.0	855	80.1	1.29
410 - 419	32	415	3.0	885	85.2	1.24
420 - 429	33	424	2.8	973	107.6	1.28
430 - 439	32	435	2.7	1008	74.8	1.23
440 - 449	25	444	2.8	1028	83.6	1.17
450 - 459	29	454	3.0	1109	109.5	1.19
460 - 469	16	464	2.9	1127	126.0	1.13
470 - 479	3	471	0.6	1308	158.8	1.26
480 - 489	3	484	2.6	1270	108.2	1.12
490 - 499	1	490	-	1200	-	1.02
Total	306	-	-	-	-	-
Mean	-	413	35.6	887	207.4	1.24

Table 19. Mean fork length, mean weight, and condition factor by length interval for female Arctic grayling from Kakisa River, 1972-78 (excluding 1973).

Length Interval (mm)	No.	Fork Length (mm) Mean	SD	Weight (g) Mean	SD	Condition Factor
300 - 309	2	304	5.7	338	53.0	1.20
310 - 319	1	314	-	350	-	1.13
320 - 329	1	323	-	-	-	-
330 - 339	5	336	2.3	500	17.7	1.32
340 - 349	2	343	0.7	550	70.7	1.37
350 - 359	9	354	2.7	588	62.7	1.32
360 - 369	21	365	2.5	625	73.9	1.28
370 - 379	25	374	2.5	676	88.5	1.29
380 - 389	39	384	3.0	734	64.2	1.29
390 - 399	25	394	2.9	783	82.2	1.28
400 - 409	45	404	3.1	818	84.3	1.24
410 - 419	27	414	2.6	888	97.5	1.25
420 - 429	39	425	2.9	936	100.0	1.22
430 - 439	29	434	2.8	997	111.1	1.22
440 - 449	22	444	2.5	1010	84.7	1.16
450 - 459	23	454	2.9	1076	116.4	1.15
460 - 469	8	463	2.1	1166	113.3	1.18
470 - 479	1	476	-	1075	-	1.00
Total	324	-	-	-	-	-
Mean	-	406	32.1	842	182.3	1.24

Table 20. Mean fork length, mean weight, condition factor, maturity and sex ratio by age for Arctic grayling from the Kakisa River, 1972.

Age (yr)	No.	Fork Length (mm) Mean	SD	Weight (g) Mean	SD	Condition Factor	Males No.	Males % Mature	Females No.	Females % Mature	F/M Ratio	No. Unknown Sex
2	1	221	-	100	-	0.93	-	-	-	-	-	1
3	2	265	35.4	225	106.1	1.16	1	0	-	-	-	1
4	4	327	29.0	435	139.9	1.20	1	0	3	33	3.0	-
5	10	371	21.2	559	87.9	1.09	5	100	3	67	0.6	2
6	14	408	25.5	735	137.3	1.07	4	25	8	100	2.0	2
7	5	419	10.2	790	80.2	1.07	2	50	3	100	1.5	-
8	1	455	-	1000	-	1.06	-	-	-	-	-	1
9	1	490	-	1200	-	1.02	1	100	-	-	-	-
Total	38	-	-	-	-	-	14	57	17	82	1.2	7
Mean	5.5[a]	382	56.1	640	230.4	1.09	-	-	-	-	-	-

[a] Mean age.

Table 21. Mean fork length, mean weight, condition factor, maturity and sex ratio by age for Arctic grayling from the Kakisa River, 1974.

Age (yr)	No.	Fork Length (mm) Mean	SD	Weight (g) Mean	SD	Condition Factor	Males No.	Males % Mature	Females No.	Females % Mature	F/M Ratio	No. Unknown Sex
4	5	324	30.7	432	146.5	1.23	2	0	1	0	0.5	2
5	16	355	26.0	542	108.3	1.19	4	25	2	0	0.5	10
6	26	389	20.4	704	132.3	1.18	12	33	7	29	0.6	7
7	35	425	23.5	913	137.8	1.17	12	42	17	88	1.4	6
8	26	438	18.3	1025	129.8	1.21	7	43	8	87	1.1	11
9	2	477	10.6	1400	-	1.35	1	100	-	-	-	1
unknown	3	405	39.5	760	198.0	1.55	-	-	-	-	-	-
Total	113[a]	-	-	-	-	-	38	37	35	69	0.8	37
Mean	6.6[b]	406	40.7	831	226.0	1.19	-	-	-	-	-	-

[a] Sample includes 37 dressed fish used only for length calculations.

[b] Mean age.

Table 22. Mean fork length, mean weight, condition factor, maturity and sex ratio by age for Arctic grayling from the Kakisa River, 1975.

Age (yr)	No.	Fork Length (mm) Mean	SD	Weight (g) Mean	SD	Condition Factor	Males No.	% Mature	Females No.	% Mature	F/M Ratio	No. Unknown Sex
5	2	376	3.5	657	137.9	1.23	1	100	1	100	1.0	-
6	3	392	21.7	882	54.8	1.49	3	100	-	-	-	-
7	9	414	33.4	996	272.7	1.37	6	83	3	66	0.5	-
8	14	431	20.7	1100	152.7	1.37	9	100	5	80	0.5	-
9	4	448	18.8	1187	154.8	1.33	2	50	2	50	1.0	-
unknown	3	452	38.3	1237	164.4	1.35	-	-	-	-	-	-
Total	35	-	-	-	-	-	21	90	11	73	0.5	-
Mean	7.5[a]	424	31.2	1051	222.5	1.36	-	-	-	-	-	-

[a] Mean age.

Table 23. Mean fork length, mean weight, condition factor, maturity and sex ratio by age for Arctic grayling from the Kakisa River, 1976.

Age (yr)	No.	Fork Length (mm) Mean	SD	Weight (g) Mean	SD	Condition Factor	Males No.	% Mature	Females No.	% Mature	F/M Ratio	No. Unknown Sex
4	2	320	17.0	450	106.0	1.36	1	0	1	100	1.0	-
5	14	374	27.2	628	111.7	1.20	3	100	11	91	3.7	-
6	37	397	21.8	780	136.9	1.24	7	100	24	100	3.4	6
7	53	416	21.5	861	121.9	1.20	5	100	42	100	8.4	6
8	29	433	19.5	947	110.5	1.16	7	100	20	100	2.8	2
9	12	438	28.3	977	185.4	1.15	4	100	7	100	1.7	1
10	3	455	24.7	1083	212.6	1.14	1	100	1	100	1.0	1
unknown	14	443	22.1	1008	186.0	1.15	-	-	-	-	-	-
Total	164	-	-	-	-	-	28	99	106	99	3.8	16
Mean	6.9[a]	415	31.7	858	176.0	1.19	-	-	-	-	-	-

[a] Mean age.

Table 24. Mean fork length, mean weight, condition factor, maturity and sex ratio by age for Arctic grayling from the Kakisa River, 1977.

Age (yr)	No.	Fork Length (mm) Mean	SD	Weight (g) Mean	SD	Condition Factor	Males No.	% Mature	Females No.	% Mature	F/M Ratio	No. Unknown Sex
3	3	293	21.0	425	35.3	1.53	2	0	-	-	-	1
4	12	356	22.1	583	97.6	1.33	4	0	5	60	1.3	3
5	44	376	23.6	737	92.1	1.34	13	84	15	87	1.2	16
6	51	398	22.3	841	129.5	1.31	23	91	16	87	0.7	12
7	58	420	22.6	955	153.8	1.26	24	100	21	100	0.9	13
8	35	436	18.1	1033	124.0	1.25	13	100	14	100	1.0	8
9	15	429	28.5	1008	135.2	1.20	5	100	4	100	0.8	6
10	1	462	-	1300	-	1.32	-	-	1	100	1.0	-
unknown	4	416	19.5	1200	-	1.55	-	-	-	-	-	-
Total	223[a]	-	-	-	-	-	84	88	76	92	0.9	59
Mean	6.4[b]	404	35.1	886	189.1	1.29	-	-	-	-	-	-

[a] Sample included 59 dressed fish used only for length calculations.

[b] Mean age.

Table 25. Mean fork length, mean weight, condition factor, maturity and sex ratio by age for Arctic grayling from the Kakisa River, 1978.

Age (yr)	No.	Fork Length (mm) Mean	SD	Weight (g) Mean	SD	Condition Factor	Males No.	% Mature	Females No.	% Mature	F/M Ratio
3	2	309	1.4	388	17.7	1.31	1	0	1	0	1.0
4	3	357	21.0	608	87.8	1.34	2	100	1	0	0.5
5	32	379	17.9	699	95.1	1.28	16	100	16	88	1.0
6	64	402	18.6	839	126.5	1.29	42	100	22	100	0.5
7	36	427	17.6	933	113.2	1.20	25	96	11	100	0.4
8	24	438	21.1	1020	144.8	1.21	14	93	10	100	0.7
9	11	450	19.5	1057	124.0	1.16	4	100	7	100	1.8
10	2	462	7.1	1250	70.7	1.27	2	100	-	-	-
unknown	12	416	29.7	898	121.8	1.25	-	-	-	-	-
Total	186	-	-	-	-	-	106	97	68	94	0.6
Mean	6.5[a]	410	31.4	869	173.8	1.25	-	-	-	-	-

[a] Mean age.

Table 26. Mean fork length, mean weight, condition factor, maturity and sex ratio by age for Arctic grayling from the Kakisa River, 1972-78 (1973 excluded).

Age (yr)	No.	Fork Length(mm) Mean	SD	Weight (g) Mean	SD	Condition Factor	Males No.	Males % Mature	Females No.	Females % Mature	F/M Ratio	No. Unknown Sex
2	1	221	-	100	-	0.93	-	-	-	-	-	1
3	7	289	26.2	346	107.7	1.33	4	0	1	0	0.3	2
4	26	343	27.8	516	132.1	1.29	10	20	11	45	1.0	5
5	118	373	23.5	669	116.2	1.25	42	88	48	83	1.1	28
6	195	399	21.3	803	138.3	1.26	91	86	77	91	0.8	27
7	196	421	22.1	913	146.6	1.21	74	86	97	96	1.3	25
8	130	436	19.1	1014	135.4	1.23	50	90	58	97	1.2	22
9	45	442	27.5	1047	168.5	1.19	17	94	20	95	1.2	8
10	6	459	16.4	1175	171.8	1.21	3	100	2	100	0.7	1
Unknown	36	429	30.1	979	191.9	1.22	-	-	-	-	-	-
Total	760[a]	-	-	-	-	-	291	84	314	91	1.1	119
Mean	6.6[b]	408	36.3	862	203.4	1.23	-	-	-	-	-	-

[a] Sample included 96 dressed fish which were used only for length calculations.

[b] Mean age.

Table 27. Mean fork length, mean weight, and condition factor for male Arctic grayling from the Kakisa River, 1972-78 (1973 excluded).

Age (yr)	No.	Fork Length(mm) Mean	SD	Weight (g) Mean	SD	Condition Factor
3	4	302	12.3	388	62.9	1.41
4	10	345	23.5	552	127.3	1.33
5	42	378	22.9	669	123.5	1.23
6	91	402	20.8	818	141.7	1.25
7	74	429	19.3	970	125.7	1.22
8	50	437	20.6	1033	144.8	1.24
9	17	458	18.9	1137	143.9	1.19
10	3	457	10.5	1192	112.7	1.25
unknown	11	425	33.9	985	297.5	1.20
Total	306	-	-	-	-	-
Mean	6.6[a]	413	35.6	887	207.4	1.24

[a] Mean age.

Table 28. Mean fork length, mean weight, and condition factor for female Arctic grayling from the Kakisa River, 1972-78 (1973 excluded).

Age (yr)	No.	Fork Length(mm) Mean	SD	Weight (g) Mean	SD	Condition Factor
3	1	308	-	375	-	1.28
4	11	341	23.2	518	118.4	1.29
5	48	374	21.1	678	108.0	1.28
6	77	393	19.8	781	134.4	1.28
7	97	417	22.1	880	148.7	1.21
8	58	432	18.0	992	130.7	1.22
9	20	434	23.7	960	143.1	1.17
10	2	449	18.9	1087	300.5	1.19
unknown	10	418	30.4	922	165.6	1.26
Total	324	-	-	-	-	-
Mean	6.7[a]	406	32.0	842	182.3	1.24

[a] Mean age.

Table 29. Length-weight relationship summary for Arctic grayling from Kakisa River, 1972 to 1978 (1973 excluded).

Year	Sex	N	Y-intercept (a)	Slope (b)	Standard Deviation of b (S_b)	95% C.I. of b
1972	males	14	-4.2077	2.7069	0.1866	2.3038 - 3.1100
	females	17	-3.8585	2.5749	0.2343	2.0782 - 3.0716
	unknown	7	-5.3239	3.1376	0.0961	2.9024 - 3.3728
	combined	38	-4.8161	2.9426	0.0962	2.7482 - 3.1370
1974	males	39	-4.3832	2.7927	0.1491	2.4914 - 3.0940
	females	35	-4.4518	2.8194	0.1911	2.4315 - 3.2073
	unknown	16	-5.1632	3.0852	0.1450	2.7762 - 3.3942
	combined	90	-4.6563	2.8963	0.0966	2.7045 - 3.0881
1975	males	23	-3.4407	2.4604	0.2207	2.0027 - 2.9181
	females	11	-7.2278	3.8893	0.6014	2.5494 - 5.2292
	combined	34	-4.5035	2.8612	0.2619	2.3295 - 3.3929
1976	males	33	-3.6946	2.5305	0.1521	2.2217 - 2.8393
	females	110	-3.4314	2.4286	0.1120	2.2068 - 2.6504
	unknown	21	-5.4199	3.1849	0.2925	2.5747 - 3.7951
	combined	164	-3.7031	2.5328	0.0854	2.3654 - 2.7002
1977	males	83	-3.6069	2.5060	0.0954	2.3165 - 2.6955
	females	73	-3.6532	2.5268	0.1418	2.2448 - 2.8088
	combined	156	-3.5727	2.4943	0.0798	2.3379 - 2.6507
1978	males	113	-3.5555	2.4813	0.1137	2.2559 - 2.7067
	females	73	-3.6381	2.5180	0.1291	2.2606 - 2.7754
	combined	186	-3.4897	2.4581	0.0842	2.2931 - 2.6231
1972-78 (combined)	males	305	-4.0676	2.6779	0.0638	2.5529 - 2.8029
	females	320	-3.8002	2.5749	0.0727	2.4324 - 2.7174
	unknown	45	-5.4929	3.2116	0.0782	3.0541 - 3.3691
	combined	670	-4.2654	2.7525	0.0440	2.6663 - 2.8387

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